



# Protective effects of bifidobacteria on intestines in newborn rats with necrotizing enterocolitis and its regulation on TLR2 and TLR4

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**ABSTRACT.** We established a necrotizing enterocolitis (NEC) rat model and explored the role of bifidobacteria in the intestines of the rats and its regulation on intestinal Toll-like receptors (TLRs). Seventy-five newborn Sprague-Dawley rats were randomly divided into 5 groups (15 rats/group): group A, artificial feeding group (formula-fed); group B, NEC model (LPS + formula-fed); group C, bifidobacterium (LPS + formula-fed + bifidobacterium microcapsules, intragastric administration); group D, artificial feeding + bifidobacterium (formula-fed + bifidobacterium microcapsules gavage); group E, rat breast-feeding group (rat breast-feeding). After 3 days of feeding, rats were placed in incubators, fasted for 12 h, and killed by decapitation. The ileocecal proximal segment ileum was fixed and sliced; pathological examination was conducted, and TLR2, TLR4, and nuclear factor- $\kappa$ B p65 protein expression in the intestinal tissue was detected by immunohistochemistry. There was a statistically significant difference

in pathological scores between groups C and B ( $H = 21.789$ ,  $P = 0.000$ ), and the former was lower than the latter. TLR2, TLR4, and nuclear factor- $\kappa$ B p65 expression in intestinal tissue was determined in groups A-E. There were statistically significant differences between groups C and B ( $P = 0.001$ ;  $P = 0.000$ ;  $P = 0.000$ ). Bifidobacteria had a protective effect on the intestines of newborn rats with NEC, which showed reduced NEC and intestinal damage severity. This observation may be related to the reduced levels of TLR2, TLR4, and nuclear factor- $\kappa$ B P65 observed during the inflammatory response.

**Key words:** Bifidobacteria; Enterocolitis; Necrotizing; Newborn; Rats; Toll-like receptor